# From 0 to 1: How Likely Is It?

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|---|---|---|---|
| **Teacher** | | **Class** | Grade 7 |
| **Subject** | Math | **Topic** | Probability |
| **Date** | | **Room** | |
| **Lesson length** | 60 minutes | **Country** | United States |

Students learn that probability is a number from 0 to 1 that shows likelihood. They place events on a human number line as unlikely, even chance, or likely.

## Curriculum links

- Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

## Learning objectives

- Students will understand probability is a number between 0 and 1 that shows likelihood.
- Students will describe events as unlikely near 0, even chance around 1/2, or likely near 1.
- Students will compare probability numbers to decide which event is more likely.

## Success criteria

- I can place a chance event on a 0 to 1 scale.
- I can label events unlikely, even chance, or likely.
- I can compare two probabilities to tell which is more likely.

## What students already know

Ask: When you flip a coin, what can happen? When you roll a six-sided die, what numbers can come up? Take 3 quick answers to check they know chance has different outcomes.

## Key words

| | |
|---|---|
| **probability** | how likely a chance event is, from 0 to 1 [3] |
| **unlikely** | near 0; probably will not happen [18] |
| **even chance** | around 1/2; neither unlikely nor likely |
| **likely** | close to 1; has a strong chance of happening [21] |

## Materials

- masking tape for floor line marked 0, 1/2, 1
- sticky notes and markers
- small paper number lines with 0, 1/2, 1 marked
- Slides 1-12 and projector
- Worksheet Task B, one per student
- mini whiteboards or cards marked near 0, around 1/2, near 1

## Before the lesson

- Make a long tape line on the floor with 0, 1/2, and 1 clearly marked and clear desks and bags for walkways
- Print Worksheet Task B for each student and small paper number lines
- Test Slides 1-12 and Video clip 1 (0:00-5:00) on slide 6 for sound and picture
- Prepare sticky notes, markers, and mini whiteboards

## Lesson outline

**0–5 min** **Starter** 5 min · Whole class

*Activate everyday ideas of chance and connect 0 to no chance and 1 to a sure thing.*

**YOU DO**

1. Show Slide 1 How Likely Is It? and Slide 2 objectives, then Slide 3 Chance Is All Around Us.
2. Read the Slide 3 examples: flipping a coin, rolling a six-sided die, picking a card, and rain tomorrow.
3. Use the hook to point to the floor tape line marked 0, 1/2, and 1.
4. Ask students to point or take one step to show where rolling a 6 would sit.

**STUDENTS DO**

1. Look at Slides 1-3 and listen to objectives.
2. Point or step to show where they think rolling a 6 sits between 0 and 1.
3. Share one other chance event from everyday life with a partner.

**Say:** If 0 means no chance and 1 means a sure thing, where would you stand to show your chance of rolling a 6 on your next try? Show me with your feet. Probability is always a number between 0 and 1 [3].

**Ask:** When you flip a fair coin, what are the possible outcomes? (Heads or tails, each with probability 1/2 [3].) · When you roll a six-sided die, what numbers can come up? (1 to 6 [18].)

**Check understanding:** Thumbs up if you can name one chance event. If many are unsure, give one more example of heads or tails before moving on.

**Support:** Let students just point to the line from their seats instead of moving. **Stretch:** Ask students to predict where rolling a 7 on one standard die would go and why.

Use: Slides 1-3

**5–17 min** **Teaching** 12 min · Whole class

*Explain that every probability lives from 0 to 1 and what 0, 1/2, and 1 mean.*

**YOU DO**

1. Show Slide 4 All Chance Lives Here and read that 0 means impossible, 1 means certain, larger means more likely.
2. Explain that probability is a number between 0 and 1, where 0 indicates impossibility and 1 indicates certainty [3], and the further right a number sits the more likely the event [21].
3. Play Video clip 1 on Slide 6 and ask students to listen for what 0, 1/2, and 1 mean.
4. Model a fair coin toss and place 1/2 in the middle as neither unlikely nor likely.

**STUDENTS DO**

1. Watch Video clip 1 and track 0, 1/2, and 1 on paper number lines.
2. Answer Slide 5 with a partner: You flip a fair coin. Is heads unlikely, an even chance, or likely? How do you know?
3. Hold up mini whiteboards showing 0, 1/2, or 1 for teacher prompts.

**Say:** All chance lives from 0 to 1. Zero is impossible and will not happen, 1 is certain and will happen [3]. A bigger number means a better chance, so 0.8 is more likely than 0.2 [21].

**Worked example:** Fair coin landing heads: there are 2 equally possible outcomes, heads and tails [3]. Favorable outcomes = 1, total outcomes = 2, so P = 1 divided by 2 = 1/2 = 0.5 = 50% [21]. On a 0 to 1 line, 1/2 sits in the middle, so we call it an even chance, neither unlikely nor likely.

**Ask:** What does a probability of 0 tell you? What does a probability of 1 tell you? (0 is impossible, 1 is certain [3].) · Why is heads on a fair coin around 1/2? (Two equal outcomes, heads and tails, so 1 out of 2 = 1/2, neither unlikely nor likely [3].)

**Check understanding:** Ask all to write P(heads) on whiteboards. Expect 1/2, 0.5, or 50%. Reteach the 2 outcomes if many write other numbers.

**Support:** Give students a small paper number line with 0, 1/2, and 1 already marked to hold while they decide.
**Stretch:** Ask why 0.52 and 0.48 both still count as around 1/2, neither unlikely nor likely.

Use: Slides 4-6, Video clip 1 (0:00-5:00)

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17–42 min **Main activity** 25 min · Whole class

*Place chance events on the 0 to 1 scale to show unlikely, even chance, and likely.*

**YOU DO**

1. Show Slide 7 Three Zones on the Scale and read the Near 0 and Near 1/2 cards with the class.
2. Call out events one at a time and have students walk slowly to the spot on the tape line that fits.
3. Use rolling a 7 on one standard die is impossible and rolling a number between 1 and 6 is certain [21] as end points.
4. Hand out sticky notes for Slide 9 task so each student writes one unlikely event and one likely event and sticks them in place.

**STUDENTS DO**

1. Walk to 0, 1/2, or 1 positions for each called event, including coin heads at 1/2 and rolling a 5 at 1/6.
2. Write two events on sticky notes, one near 0 for unlikely and one near 1 for likely, and stick them on the line.
3. Draw a line from 0 to 1, mark 1/2 in the middle, and add one unlikely, one even-chance, and one likely event as in Slide 9.

**Say:** You will show likelihood with your feet. I will call an event, you walk slowly with no pushing to where it belongs from 0 to 1. Be ready to say in one sentence why you stood there.

**Worked example:** Bag with 4 blue and 1 red marbles, pick blue without looking: number of ways it can happen divided by total outcomes [18]. That is 4 divided by 5 = 4/5 = 0.8 [18]. On the 0 to 1 line 0.8 sits near 1, so it is likely, and larger numbers mean more likely [21].

**Ask:** The probability of rolling a 5 on a standard die is what, and where does it sit? (1/6 [6], near 0, so unlikely, because 1 way out of 6 outcomes [18].) · Which is more likely, 1/6 or 4/5, and how do you know? (4/5 = 0.8 [18], it is larger so it is more likely [21].)

**Check understanding:** Each group holds up a card marked near 0, around 1/2, or near 1 and explains its choice in one sentence. Move any misplaced notes together.

**Support:** Give students a small paper number line with 0, 1/2, and 1 already marked to hold while they decide where to stand. **Stretch:** Students must explain why a 0.52 and a 0.48 both count as around 1/2, neither unlikely nor likely.

Use: Slides 7, 9

42–52 min **Practice** 10 min · Pairs

*Order given probabilities and match numbers to unlikely, even chance, and likely.*

**YOU DO**

1. Hand out Worksheet Task B and read the directions together.
2. Model ordering two values: 1/6 is near 0 and unlikely, 4/5 = 0.8 is near 1 and likely [18].
3. Give pairs 7 minutes to order probabilities and write unlikely, even chance, or likely for each.
4. Circulate and prompt pairs to compare sizes left to right from 0 to 1.

**STUDENTS DO**

1. Complete Worksheet Task B by ordering probabilities and labeling likelihood.
2. Compare lines with a partner and agree on order and labels.

**Say:** Work in pairs. Put the numbers in order from smallest near 0 to largest near 1. Next to each, write unlikely if near 0, even chance if around 1/2, or likely if near 1.

**Worked example:** Order 0.25, 1/2, and 0.9: smallest is 0.25 near 0 so unlikely, middle is 1/2 = 0.5 = 50% so even chance [21], largest is 0.9 near 1 so likely. Check left to right: 0.25 < 0.5 < 0.9.

**Ask:** Where does 1/6 belong and why? (Near 0, unlikely, because any one face on a single die has probability 1/6 [18].) · How do 1/2, 0.5, and 50% compare? (They are the same chance, an even chance around 1/2 [21].)

**Check understanding:** Cold-call pairs to read their line left to right. If order is wrong, place the values on the class 0 to 1 line together.

**Support:** Provide sentence starters like This is near 0 because it has few ways to happen out of many outcomes. **Stretch:** Students create one new event for each category and order all three by exact size.

Use: Worksheet Task B

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52–60 min **Plenary** 8 min · Whole class

*Review key words and check that students can use the 0 to 1 scale.*

**YOU DO**

1. Show Slide 10 Key words and have class say each meaning together.
2. Run Slide 11 vote on which even-chance game to try next: coin heads or tails, die even or odd, card red or black.
3. Use Slide 12 Quick quiz for final check on 0 and around 1/2.
4. Link the vote choices to around 1/2, neither unlikely nor likely.

**STUDENTS DO**

1. Say key word meanings and vote for the next even-chance game.
2. Answer the Slide 12 quiz prompts with cards or whiteboards.
3. State one takeaway: where their sticky note sits and why.

**Say:** Let's lock it in. Probability tells how likely a chance event is, from 0 to 1. Near 0 is unlikely, around 1/2 is even chance, near 1 is likely. Show me you can use those words.

**Ask:** A probability of 0 means what? (Impossible — it will not happen.) · What does a probability around 1/2 tell you? (Even chance — neither unlikely nor likely.) · Which is more likely, 0.25 or 0.75, and why? (0.75, because larger numbers indicate greater likelihood.)

**Check understanding:** Use Slide 12 quiz answers on whiteboards. If many miss, re-place 0, 1/2, and 1 on the floor line before dismissal.

**Support:** Let students answer by pointing to near 0, around 1/2, or near 1 cards instead of speaking. **Stretch:** Ask students to argue whether 3/8 is unlikely, even, or likely and where it sits.

Use: Slides 10-12

## Common mistakes

| Mistake | How to spot it | How to fix it |
|---|---|---|
| Thinking probability can be greater than 1 or less than 0 | Student writes 1.2 or 120% or a negative as a probability | Point to the 0 to 1 line and restate probability is always between 0 and 1, where 0 indicates impossibility and 1 indicates certainty [3]. |
| Thinking 1/2 means heads must happen every other flip exactly | Student says 10 flips must give exactly 5 heads | Remind that 1/2 is the long-run chance for a fair coin [3]; short sets vary but stay near 1/2, neither unlikely nor likely. |
| Mixing up which fraction is larger, for example 1/6 larger than 4/5 | Orders 4/5 before 1/6 or labels 1/6 as likely | Convert to decimals: 1/6 is about 0.17 near 0 [18] and 4/5 = 0.8 near 1 [18]; larger numbers mean more likely [21]. |

## Support

- Give students a small paper number line with 0, 1/2, and 1 already marked to hold while they decide where to stand.
- Provide sentence starters like This is near 0 because it has few ways to happen out of many outcomes.
- Allow pointing to sorting cards instead of explaining aloud in plenary.

## Stretch

- Students must explain why a 0.52 and a 0.48 both count as around 1/2, neither unlikely nor likely.
- Students create one new event for each category and order all three by exact size.
- Students design a spinner worth 3/8 and argue whether it is unlikely, even, or likely.

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## For the LSE or teaching assistant

Stay near the tape line during movement. Guide focus students to the small paper line, read events aloud, and prompt one-sentence reasons using near 0, around 1/2, near 1.

## Safety

- Clear desks and bags, leave wide walkways, and have students walk slowly with no pushing or contact.

## Check for understanding

| Question | Answer |
|---|---|
| A bag has 4 blue and 1 red marble. What is P(blue) and is it unlikely, even chance, or likely? | 4/5 = 0.8 [18], likely near 1. |
| What does P = 1/2 mean in words? | Even chance, neither unlikely nor likely, like heads on a fair coin [3]. |
| Which is more likely: rolling a 5 (1/6) or flipping heads (1/2)? Why? | Flipping heads, because 1/2 is larger than 1/6 and larger means more likely [21]. |

## Homework

Write three events from home life: one unlikely, one even chance, one likely, with a probability for each.

## Sources


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23. Answers to: The student body of a large university consists of 30% Business majors. A random sample of 20 students is selected. a. What is the probability that among the students in the sample at leas · classace.io · https://www.classace.io/answers/the-student-body-of-a-large-university-consists-of-30-business-majors-a-random-sample-of-20-students-is-selected-a-what-is-the-probability-that-among-the-students-in-the-sample-at-least-10-are-busines
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